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ABSTRACT

The Teacher Enhancement Institute (TEI) on the campus of Saint Vincent College in Latrobe, Pennsylvania involved a diverse group of teachers actively pursuing instructional improvement through workshops in thinking skills, content area, and group seminars. This test was prepared by a team of middle school science and mathematics teachers at the TEI and incorporates basic science and mathematical concepts into an amusement park setting. The test includes questions on the food and rides found at the amusement park. (JRH)

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ED 405 203

Saint Vincent College Teacher Enhancement Institute
Middle School Science and Mathematics
Amusement Park Test

Dr. Thomas Giles And The Middle School Teachers
Saint Vincent College, Latrobe, Pennsylvania

Introduction

The team of middle school science and mathematics teachers_ decided a wealth of science learning situations can be found in any amusement in any area. As a preparation the teachers sought the assistance of the Idlewild Park of Ligionier, Pennsylvania and prepared a test incorporating basic science concepts and basic mathematics concepts taught in the middle school. The team realizing the growing interest in partnerships between schools and community business and industry has found a life size science laboratory that takes the classroom into world in a way that has motivation and interesting experiences as integral parts. The team piloted the activities and evaluated the practicality of each of the items in the test. The participating teachers teach in schools in a fifty mile radius of Latrobe which lies about thirty five mile east of Pittsburgh. The teachers represent private, parochial, and public schools for grades from four through nine. The representations of work and ideas in the project incorporates this broad spectrum of interests and needs.

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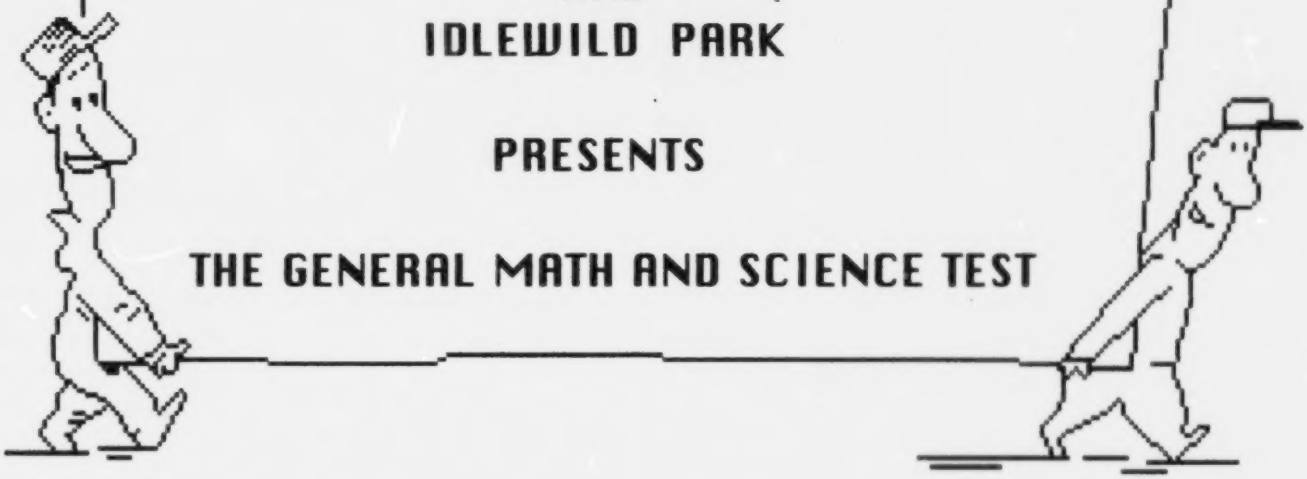
THE TEACHER ENHANCEMEMNT INSTITUTE
OF
SAINT VINCENT COLLEGE

AND
IDLEWILD PARK

PRESENTS

THE GENERAL MATH AND SCIENCE TEST



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DR. TOM GILES

FOOD QUESTIONS

1. At the funnel cake pavilion, the oil in the fryer is at 350 degrees Fahrenheit. It takes 2 1/2 minutes to cook and unload a cake and 5 cakes can be cooked at a time.

   A. What is the maximum number of cakes that can be prepared and served in one hour?

   B. If the oil were heated to 375 degrees, what effect would this have on the finished cakes?

2. Find the average length of a Potato Patch fry. Estimate the total fry length in one serving basket of fries. How many servings of fries would it take to follow the entire track on the rollo coaster if the fries were laid end to end?

3. How many pieces of popcorn are in each large box if each piece has a volume of one cubic centimeter ?

4. A. How much sugar is needed to make one ball of cotton candy? (16 cups of sugar/100 bags), 4 cotton balls/bag)

B. What is the true volume of a serving of cotton candy. If it were compressed by hand to the smallest possible cube?

5. Estimate the number of lemons used in one day at the Lemonade Stand at 1/2 lemon/glass. Be as accurate as possible and explain your answer.

GENERAL QUESTIONS

1. Calculate the total number of legs present if every chair in the amphitheater were occupies.

2. How many square of shingles would it take to cover the roof of the gazebo at the rear of the amphitheater? (HINT: How many **square feet** in one **square** of shingle?)

3. A. If you average 300 points/game of SkeeBall, how many games must you play to win 55 coupons?

   B. Graph the relationship between points scored and coupons earned.

4. At the Animal House game, calculate the percent chance of winning:

A. any prize
B. a red hole prize
C. a green hole prize
D. an orange hole prize

5. Calculate the amount of profit earned by the park per day on the Super Shovel if it can continuously for one working day.

6. What is the estimated seating capacity of all the dark green benches in the park? (Do not include Story Book Forest) Explain Your answer.

7. Approximately how many square feet of the park grounds are covered by a variety of annual plant life? (Do not include Story Book Forest) Explain your answer.

8. Find the bridge which gives directions to Confusion Hill. The water forms a pool just below the bridge. In which direction does the water flow **in the pond** ?

RIDE QUESTIONS

(BE SURE TO SHOW YOUR CALCULATIONS AND/OR EXPLAIN HOW YOU GOT YOUR ANSWERS)

Confusion Hill

A. How many tours can go through per day ?
B. Why do you go through the Mineshaft before entering the rooms?
C. Why does the guide take a different route?
D. What makes the water appear to run up hill?
E. Why does the chair "stick" to the wall?

Ferris Wheel

Calculate the angular speed of the ride after it is loaded and the ride is in full motion.

The Spider

How many points of rotation can be found on this ride?

Balloon Race

Estimate the number of light bulbs found on the ride. Explain

Loyalhanna Limited Railroad

A. What is the source of electricity for the lights on the train ?
B. How many railroad ties are on each bridge along the track?

Jumpin' Jack

A. What force (s) propel the cars along the Turtle Parkway?
B. How many balls are in Bubbling Spring?
C. What is the distance from the bottom of the Cargo Net to the platform at the top of the tower?
D. List which of Newton's Laws are involved in the propulsion of the boats in Alligator Swamp? Explain how they work.
E. Explain the principle (s) on which thc Jungle Phone operates.

Merry-GO-ROUND

A. Name the simple machine (s) found here and explain how they work.
B. What is the circumference of the large platform?
C. What is the maximum ride capacity?
D. What is the average percent capacity on a single ride? Chart three separate rides and average the numbers.

The H_2O-H-H-H Zone

A. What is the perimeter of the pool?
B. What is the surface area of the water?
C. If the average water depth is 5 feet, what volume of water is in the pool?
D. Draw a cross section of the pool.

The Roundup

A. What is the circumference of the ride?
B. What is the top speed that it attains?
C. What force (s) keeps a rider from falling out at the top of the ride? Explain

Caterpillar Ride

A. How long does it take for the ride to make one complete revolution?
B. Calculate the distance traveled in one revolution.
C. Calculate the speed of one revolution when the ride is in full motion.
D. What impact, if any, does the green covering have on the speed per revolution. Explain.
E. Estimate the maximum number of people that the ride can accommodate per hour. Explain.

Lakeview Railroad

A. How long does it take the train to complete one trip?

B. Calculate the distance of one trip.

C. Calculate the average velocity of the train.

D. Estimate the maximum number of people to ride the train per day if the train is at maximum capacity for each ride. Explain.

Wild Mouse

A. Estimate the number of people the ride can accomodate each day. Explain.
B. Calculate the distance of one trip.
C. What factors could influence the differences in speed during the ride?
D. Explain why the ride travels slower in the morning and faster in the afternoon and when the track is wet?
E. What is the height of the cars at the top of the lift?
F. Calculate the potential and kinetic energy of the cars at the top of the lift.

TEACHER INFORMATION

1. Normal operating hours of the park are 11:00 AM to 9:00 PM.

2. One square of shingles contains 100 square feet.

3. At the Animal House: 390 holes total
   2 red holes
   5 orange holes
   8 green holes
   only colored holes will win a prize

4. The Super Shovel: $0.75 runs the Shovel for 1 minute, 7 seconds.
   2 shovels can be operated at time
   operating hours are 10:00 AM to 9:00 PM

5. To find the circumference of a circle, multiply pi (3.14) times the diameter.

6. At Bubbling Spring, you can use the approximate measurements: depth-3 feet, length of a side-15 feet, shape-hexagon, ball diameter-3 inches.

7. For the Cargo Net, students will need the information (and a sextant) for determining the height of the platform and the formula for finding the hypotenuse of a right triangle-$a2 + b2 = c2$.